☑003

PLEASE AMEND THE CLAIMS AS FOLLOW:

1.   (Currently Amended) A grooming system, comprising a plurality of input channels, and at least one output channel, the system comprising:

a Common Time Reference (CTR), divided into a plurality of contiguous time frames (TFs), wherein the time frames have a plurality of predefined time durations;

~~wherein each of the input channels has at least one of a plurality of associated channel bit rates;~~

wherein each of the input channels are associated with respective time frames grouped according to a respective common time cycle;

wherein the at least one output channel is associated with respective time frames grouped according to a respective common time cycle;

wherein each of the time frames provides for transfer of a plurality of data units;

first means for mapping the time frames from the respective subset of the time frames associated with the respective ones of the input channels for each of the plurality of the data units;

second means for mapping each of the time frames associated with the at least one output channel, from a respective subset of the time frames for respective ones of the input channels, to provide a defined delay between the respective time frames associated with the transfer of each of the data units from the respective input channel, to the respective at least one output channel.;

~~wherein each of the time frames provides a plurality of data units; and~~

~~means for mapping the time frames from the respective subset of the time frames associated with the respective ones of the input channels for each of the plurality of the data units.~~

2.   (Canceled)

3.   (Canceled)

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4.   (Previously Presented) The system as in claim 1, wherein the common cycles have a common duration.

5.   (Previously Presented) The system as in claim 1, wherein the common cycles for each of the channels are time offset relative to the respective common cycles for the other ones of the channels.

6.   (Previously Presented) The system as in claim 1, wherein the common cycles for each of the channels are aligned relative to the CTR.

7.   (Previously Presented) The system as in claim 1, wherein the common cycles for each of the channels are time offset relative to the CTR.

8.   (Previously Presented) The system as in claim 1, wherein the mapping reoccurs periodically for each of the common cycles.

9.   (Original) The system as in claim 1, wherein each of the time frames for the output channel is comprised of at least one sub-time frame;

          wherein each of the input channel time frames is mapped into a respective one of the output channel sub-time frames.

10.   (Original) The system as in claim 1, wherein each of the time frames for the input channels and the output channels is comprised of at least one sub-time frame;

          wherein each of the input channel sub-time frames is mapped into a respective one of the output channel sub-time frames.

11.   (Canceled)

12.   (Previously Presented) The system as in claim 1, wherein the data units from each of the plurality of the input channels for the respective subset are combined in a predefined order with the data units from other ones of the plurality of the input channels for the respective subset.

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13.   (Previously Presented) The system as in claim 1, wherein the data units are at least one of a byte, a word, a packet, and an ATM cell.

14.   (Canceled)

15.   (Canceled)

16.   (Canceled)

17.   (Previously Presented) The system as in claim 1, wherein a time stamp is associated with selected ones of the time frames, and

    wherein the time stamps are derived responsive to the CTR.

18.   (Previously Presented) The system as in claim 1, wherein each one of the input channels and the output channels is at least one of an optical channel, a wavelength division multiplexing channel, a fiber channel, and a SONET optical channel: OC-1 to OC-192.

19.   (Currently Amended) The system as in claim 1, wherein the _second_ means for mapping combines at least one of the following: two time frames of selected ones of the input channels into one time frame of a selected one of the output channels, four time frames of selected ones of the input channels into one time frame of a selected one of the output channels, eight time frames of selected ones of the input channels into one time frame of a selected one of the output channels, and sixteen time frames of selected ones of the input channels into one time frame of a selected one of the output channels.

20.   (Currently Amended) The system as in claim 1, wherein the _second_ means for mapping combines at least one of the following: selected parts of two time frames of selected ones of the input channels into one time frame of a selected one of the output channels, selected parts of four time frames of selected ones of the input channels into one time frame of a selected one of the output channels, selected parts of eight time frames of selected ones of the input channels into

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one time frame of a selected one of the output channels, and selected parts of sixteen time frames
of selected ones of the input channels into one time frame of a selected one of the output
channels.

21.   (Currently Amended) A grooming system, comprising:

a plurality of grooming subsystems, each grooming subsystem comprising:

at least one output channel and a plurality of input channels each
associated with a plurality of channel bit rates,

a Common Time Reference (CTR), divided into a plurality of contiguous time
frames (TFs), wherein the time frames have a plurality of predefined time durations;

means for mapping a scheduling of transfer of data units from a respective subset
of the time frames for the respective ones of the input channels to a respective ~~output
channel for each~~one of the time frames for each of the output channels ~~from the plurality
of grooming subsystems~~to provide a defined time delay between transfer of each of the
respective data units from the respective input channel to the respective output channel~~;~~.

~~wherein the time frames for each of the input channels from the plurality of
grooming subsystems are grouped according to a respective common cycle;~~

~~wherein the time frames for each of the output channels from the plurality of
grooming subsystems are grouped according to a respective common cycle of a plurality
of common cycles; and~~

~~wherein all the common cycles have a common duration and are associated with
respective ones of the input channels and the output channels from the plurality of
grooming subsystems.~~

22.   (Canceled)

23.   (Currently Amended) The system as in claim ~~21~~66, wherein the common cycles for each
of the channels are time offset relative to the respective common cycles for the other ones of the
channels.

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24.   (Original) The system as in claim 21, wherein the output channels from a first plurality of the grooming subsystems are coupled to the input channels of a first separate one of the grooming subsystems, to provide a first grooming output.

25.   (Original) The system as in claim 24, wherein the output channels from a second plurality of the grooming subsystems are coupled to the input channels of a second separate one of the grooming subsystems, to provide a second grooming output;

       wherein the system is further comprised of a third grooming subsystem, wherein the first and second grooming outputs are coupled to the input channels of the third grooming subsystem.

26.   (Original) The system as in claim 21, wherein each one of the input channels and the output channels is at least one of an optical channel, a wavelength division multiplexing channel, a fiber channel, a SONET optical channel: OC-1 to OC-192.

27.   (Currently Amended) A grooming subsystem, comprising:

       a plurality of input channels, and at least one output channel;

       a Common Time Reference (CTR), divided into a plurality of contiguous time frames (TFs), wherein the time frames have a plurality of predefined time durations;

       wherein each of the time frames ~~consists of~~is associated with a predefined number of plurality of data units; and

       ~~wherein the data units are each at least one of a byte, a word, a packet and an ATM cell; and~~

       means for mapping for each of the time frames of each of the output channels a predefined subset of the data units from a respective subset of the time frames for a respective subset of the input channels to provide a defined delay between transfer of each of the data units from the respective input channel to the respective output channel.

28.   (Canceled)

29.   (Original) The system as in claim 27,

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wherein the mapping of the data units for the time frames of the input channels

into the respective time frame of the respective output channel is done in a predefined

order.

30.   (Canceled)

31.   (Currently Amended) A degrooming system, comprising:

a plurality of degrooming subsystems, each degrooming subsystem comprising: a

plurality of output channels, and at least one input channel;

a Common Time Reference (CTR), divided into a plurality of contiguous time

frames (TFs), wherein the time frames have a plurality of predefined time durations; and

wherein each of the time frames provides a plurality of data units;

first means for mapping a scheduling of transfer of selected ones of the data units

for each respective one of the time frames, from a respective input channel to at least one

time frame associated with the at least one of the output channels from at least one of the

plurality of degrooming subsystems;

second means for mapping a scheduling for transfer of data units for each

respective one of the time frames from the respective input channel to at least one time

frame of at least one of the output channels from the plurality of degrooming subsystems,

to provide a defined delay between the transfer of each respective data unit from the

respective input channel to the respective output channel;

wherein the time frames for each of the output channels from the plurality

of degrooming subsystems are grouped according to a respective common cycle;

wherein the time frames for each of the input channels from the plurality

of degrooming subsystems are grouped according to a respective common cycle;

and

~~wherein each of the time frames provides a plurality of data units.~~

32.   (Canceled)

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33.   (Previously Presented) The system as in claim 31, wherein the common cycles for each of the channels are time offset relative to the respective common cycles for the other ones of the channels.

34.   (Previously Presented) The system as in claim 31, wherein the mapping reoccurs periodically for each of the common cycles.

35.   (Previously Presented) The system as in claim 31, wherein each of the time frames for the input channel is comprised of at least one sub-time frame;

        wherein said input channel sub-time frame is mapped into at least one of the output channel time frames.

36.   (Previously Presented) The system as in claim 31, wherein each of the time frames for the output channels and each of the time frames for the input channels is comprised of at least one sub-time frame;

        wherein said input channel sub-time frame is mapped into said output channel sub-time frame.

37.   (Previously Presented) The system as in claim 31,

        wherein the mapping of the time frames for the respective ones of the output channels is provided from a respective subset of the input channels; and

        wherein each of the time frames of the output channels receives a subset of data units from the input channel.

38.   (Previously Presented) The system as in claim 31, wherein the data units arc at least one of a byte, a word, a packet, an ATM cell.

39.   (Previously Presented) The system as in claim 31, wherein delimiters are provided between data units.

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40.   (Original) The system as in claim 31, wherein delimiters are provided between time frames.

41.   (Previously Presented) The system as in claim 31, wherein a time stamp is associated with selected ones of the time frames, and

          wherein the time stamp is derived responsive to the CTR.

42.   (Previously Presented) The system as in claim 31, wherein each of the input channels and output channels is at least one of an optical channel, a wavelength division multiplexing channel, a fiber channel, and a SONET optical channel: OC-1 to OC-192.

43.   (Currently Amended) A grooming method, for use in scheduling transfer of data units with a switching system comprising a plurality of input channels, and at least one of a plurality of output channels, the method comprising:

          providing a Common Time Reference (CTR);

          dividing the CTR into a plurality of contiguous time frames (TFs), wherein the time frames have a plurality of predefined time durations, wherein a plurality of data units can be transferred within each of the time frames;

          mapping a scheduling of transfer of respective selected ones of the data units for each of the input channels, into selected ones of the time frames from a respective subset of the time frames for each respective ones of the input channels; and

          mapping into a scheduling of transfer of the respective selected data units into respective selected ones each of the time frames for each of the output channels, from a each of the respective subset of the time frames for the respective ones of the input channels, to provide a defined delay between the transfer of the respective data unit from the respective input channel to the respective output channel.

          grouping the time frames for each of the output channels and the input channels associated according to a respective common cycle; and

          associating each of the common cycles with respective ones of plurality of input channels and said at least one of a plurality of output channels.

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44.   (Canceled)

45.   (Previously Presented) The method as in claim 43, wherein the common cycles have a common duration.

46.   (Previously Presented) The method as in claim 43, wherein the common cycles for each of the channels are time offset relative to the respective common cycles for the other ones of the channels.

47.   (Previously Presented) The method as in claim 43, wherein the common cycles for each of the channels are aligned relative to the CTR.

48.   (Previously Presented) The method as in claim 43, wherein the common cycles for each of the channels are time offset relative to the CTR.

49.   (Previously Presented) The method as in claim 43, further comprising:
            providing the mapping for each of the common cycles on a periodically
            reoccurring basis.

50.   (Original) The method as in claim 43, wherein each of the time frames for the output channel is comprised of at least one sub-time frame, the method further comprising:
            mapping each of the input channel time frames into a respective one of the output
            channel sub-time frames.

51.   (Original) The method as in claim 43, wherein each of the time frames for the input channels and the output channels is comprised of at least one sub-time frame, the method further comprising:
            mapping each of the input channel sub-time frames into a respective one of the
            output channel sub-time frames.

52.   (Previously Presented) The method as in claim 43, the method further comprising:

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mapping the time frames for respective ones of the input channels provided for each of the data units from a respective subset of the input channels to the respective output channel.

53.   (Original) The method as in claim 52, further comprising:

combining the data units from each of the plurality of the input channels for the respective subset in a predefined order with the data units from other ones of the plurality of the input channels for the respective subset.

54.   (Currently Amended) A grooming method for use with a switching system, comprising a plurality of input channels, and at least one output channel, the method comprising:

providing a Common Time Reference (CTR);

dividing the CTR into a plurality of contiguous time frames (TFs), wherein the time frames have a plurality of predefined time durations, wherein each of the time frames consists can provide for communications of a predefined number of plurality of data units; and

mapping for each of the time frames of each of the output channels a predefined subset of the data units from a respective subset of the time frames for a respective subset of the input channels, to provide a defined delay between the transfer of each respective one of the plurality of data units from the respective input channel to the respective output channel.

55.   (Original) The method as in claim 54,

wherein the data units are at least one of a byte, a word, a packet, an ATM cell.

56.   (Currently Amended) A degrooming method, for use in providing for transfer of a plurality of data units, with a switching system comprised of a plurality of output channels, and at least one input channel, comprised of the method comprising:

providing a Common Time Reference (CTR),

dividing the CTR into a plurality of contiguous time frames (TFs), wherein the time frames have a plurality of predefined time durations;

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mapping for each respective one of the time frames from the respective input

channel, to at least one time frame of associated with at least one of the output channels

to provide a defined delay between the transfer of the respective data unit from the

respective input channel to the respective output channel;

 grouping the time frames for each of the output channels and the at least one input

channel; and

 associating each of the groupings of time frames with a respective common time

cycle of a plurality of time cycles.

57. (Canceled)

58. (Previously Presented) The method as in claim 56, wherein the common cycles for each

of the channels are time offset relative to the respective common cycles for the other ones of the

channels.

59. (Previously Presented) The method as in claim 56, wherein the mapping reoccurs for

each of the common cycles on a periodically reoccurring basis.

60. (Original) The method as in claim 56, wherein each of the time frames for the input

channel is comprised of at least one sub-time frame, the method further comprising:

 mapping each of the input channel sub-time frames into at least one of the output

channel time frames.

61. (Original) The method as in claim 56, wherein each of the time frames for the output

channels and the input channels is comprised of at least one sub-time frame, the method further

comprising:

 mapping each of the input channel sub-time frames is mapped into one of the

output channel sub-time frames.

62. (Original) The method as in claim 56, wherein each of the time frames provides a

plurality of data units, the method further comprising:

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mapping the time frames for the respective ones of the output channels from a respective subset of the input channels; and

receiving for each of the time frames of the output channels a subset of data units from the input channel.

63.   (New) The system as in claim 1, further comprising:

a degrooming subsystem comprising:

a plurality of degrooming subsystems, each degrooming subsystem comprising a plurality of output channels, and at least one input channel;

a Common Time Reference (CTR), divided into a plurality of contiguous time frames (TFs), wherein the time frames have a plurality of predefined time durations; and

wherein each of the time frames is associated with transfer of up to a plurality of data units;

first means for mapping a scheduling of transfer of selected ones of the data units for each respective one of the time frames from a respective input channel to at least one time frame associated with at least one of the output channels from at least one of the plurality of degrooming subsystems;

second means for mapping a scheduling for transfer of respective selected ones of the data units for each respective one of the time frames from the respective input channel to at least one time frame of at least one of the output channels from the plurality of degrooming subsystems, to provide a defined delay between the transfer of the respective data unit from the respective input channel to the respective output channel;

wherein the time frames for each of the output channels from the plurality of degrooming subsystems are grouped according to a respective common cycle;

wherein the time frames for each of the input channels from the plurality of degrooming subsystems are grouped according to a respective common cycle.

64.   (New) The system as in claim 1, wherein each of the input channels has at least one of a plurality of associated bit rates.

65.   (New) The system as in claim1, further comprising:

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a plurality of switches interconnected by selected ones of the plurality of input channels and the plurality of output channels,

wherein the CTR is coupled to the plurality of switches,

wherein the first means for mapping is associated with a first switch,

wherein the second means for mapping is associated with a second switch;

wherein the defined delay is between the transfer of a respective data unit between the first switch and the second switch.

66.   (New) The system as in claim 21, wherein the time frames for each of the input channels from the plurality of grooming subsystems are grouped according to a respective common cycle;

wherein the time frames for each of the output channels from the plurality of grooming subsystems are grouped according to a respective common cycle of a plurality of common cycles; and

wherein all the common cycles have a common duration and are associated with respective ones of the input channels and the output channels from the plurality of grooming subsystems.

67.   (New) The system as in claim 27, wherein the data units are each at least one of a byte, a word, a packet, and an ATM cell.

68.   (New) The system as in claim 27, wherein there are a plurality of grooming subsystems each comprised of a plurality of input channels and a plurality of output channels.

69.   (New) The system as in claim 68, wherein the means for mapping is associated with a first grooming subsystem, the system further comprising:

second means for mapping associated with a second grooming subsystem, for mapping for each of the time frames of each of the output channels, a predefined subset of the data units from a respective subset of time frames for a respective subset of input channels, to provide a defined delay between the transfer of the respective data unit from the respective input channel to the respective output channel.

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70.   (New) The system as in claim 27, further comprising:

second mapping means for associating each of the time frames of each of the output channels with a predefined subset of the data units from a respective subset of the time frames for a respective subset of the input channels, to provide a defined delay between the transfer of the respective data unit from the respective input channel to the respective output channel.

71.   (New) The system as in claim 32, wherein the first means for mapping is associated with a first degrooming subsystem, wherein the second means for mapping is associated with a second degrooming subsystem.

72.   (New) The method as in claim 43, further comprising:

grouping the time frames for each of the output channels and the input channels associated according to a respective common cycle; and

associating each of the common cycles with respective ones of plurality of input channels and said at least one of a plurality of the output channels.

73.   (New) The method as in claim 54, further comprising:

mapping for each of the time frames of each of the output channels, a second predefined subset of the data units from a respective subset of the time frames for a respective subset of the input channels, to provide a defined delay between the transfer of the respective data unit from the respective input channel to the respective output channel.

74.   (New) The method as in claim 56, further comprising:

mapping for each respective one of the time frames from a respective second input channel to at least one time frame of at least one of the output channels, to provide a defined delay between the transfer of the respective data unit from the respective input channel to the respective output channel.

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